

SITE BRIEFING
FOR THE
CONTAMINATED SEDIMENTS TECHNICAL ADVISORY
GROUP
PORTLAND HARBOR
SUPERFUND SITE

PORTLAND, OREGON

MEETING: AUGUST 12 - 14, 2003

SITE BACKGROUND

The Portland Harbor Site is located along the lower Willamette River in Portland, Oregon. The Initial Study Area (ISA), a six mile stretch between the southern tip of Sauvie Island (RM 3.5) and Swan Island (RM 9.5), is the most industrialized segment of the river (see attached site maps). The manufacturing and ship building/repair history dates back more than a century. Current or historical industrial activities and processes that may have lead to releases to the ISA include petroleum storage and distribution, chemical manufacturing and formulation (pesticide/herbicide, asphalt, paint, resins, acetylene), oil gasification, pole treating, metals salvage, marine fueling, ship building and repair, railroad operations, electrical power generation and other manufacturing.

A federal navigation channel, with an authorized depth -40ft, extends through the ISA to RM 11.6. It ranges from 600 to 1,900 feet wide. Certain parts of the river (near RM 2 and between RM 8 and 10) require periodic maintenance dredging to keep the channel for container and other commercial vessels that use the river.

The lower Willamette River is a migratory route for several ESA species, including chinook salmon and steelhead, and Pacific lamprey, currently classified as a species of special concern by US Fish and Wildlife Service. It also supports several resident fish species, and has access points for several ethnically diverse neighborhoods that use the river for recreational and subsistence purposes.

The McCormick and Baxter Superfund Site is located at RM 7 in the Portland Harbor area. This site, the location of a former wood treating facility, was placed on the NPL in 1994, before Portland Harbor was listed. As such, it is a separate Superfund site within the Portland Harbor ISA. DEQ is the lead agency for the fund-lead cleanup at M&B. The Record of Decision directing the cleanup was completed in 1996. Upland soil cleanup was completed in 1999 and limited NAPL recovery from shallow groundwater was initiated. Because recovery of creosote from groundwater did not prevent ongoing seepage to the Willamette River, DEQ concluded that a subsurface barrier wall was needed for containment. The subsurface barrier wall was completed in July, 2003 to contain 17 acres of creosote-contaminated soil and groundwater. Groundwater monitoring wells to evaluate the performance of the barrier wall will be installed this fall. The next step in the cleanup is the installation of a sediment cap to isolate contaminated sediments in the river bottom. Extensive design and engineering work for the sediment cap remedy identified in the ROD were completed this year.

Several limited sediment investigations near other specific upland facilities were conducted prior to NPL Site listing in 2000. EPA and the Oregon Department of Environmental Quality (DEQ) conducted a joint investigation of near-shore sediments with Portland Harbor. Investigations completed to date have identified metals, PAHs, chlorinated pesticides, PCBs, chlorinated herbicides, dioxins and furans, and phthalates in sediments. Based on the results, EPA determined that the site was eligible for NPL listing.

DEQ submitted a formal request to EPA for deferral of the Site in March, 2000. EPA received extensive comments from tribal governments and natural resource trustee agencies supporting NPL listing, and listed the site in December 2000.

In September 2001 an Administrative Order on Consent (AOC) for an RI/FS was signed by EPA and nine PRPs (Atofina Chemicals, Inc., Chevron USA Inc., Gunderson, Inc., Northwest Natural Gas, City of Portland, Port of Portland, Time Oil Co., ConocoPhillips (formerly Tosco Corporation), and Union Pacific Railroad Company). Oregon Steel Mills became a signatory to the AOC in August 2002. The PRPs formed the Lower Willamette Group (LWG), which includes AOC signatories and non-signatories.

The LWG submitted a Round 1 Work Plan in May 2002. EPA did not approve the work plan but did allow fish tissue and limited co-located sediment sampling to proceed in the fall of 2002.

Round 1 Sampling included the following:

Collected over 1,000 individual samples from 12 fish species and one crayfish species in fall of 2002. Tissue from two clams was also collected. Tissues from these species are being analyzed for contaminants of interest. Validated data is expected to be available in late August.

Surface sediment samples were collected at stations where crayfish and sculpin (bottom-dwelling fish) were collected to allow comparison of fish tissue contaminant levels with sediment contaminant concentrations.

Sediment samples at recreational and industrial use beach areas were collected for analysis and evaluation in the human health risk assessment.

Limited benthic invertebrate sampling was attempted using multiplate samplers, however insufficient sample volumes were obtained.

The LWG submitted a revised RI/FS Work Plan on March 31, 2003 and a Round 2A Field Sampling Plan on April 17, 2003. These documents are currently under review.

Additional Site information is available on the EPA Region 10 Website.

<http://yosemite.epa.gov/r10/cleanup.nsf/9f3c21896330b4898825687b007a0f33/e46ae970d06761ce882567ac007316b9?OpenDocument>

A site map with links to specific information on uplands sites and contaminants is available on the DEQ website

<http://www.deq.state.or.us/nwr/ph.htm>

RISK MANAGEMENT PRINCIPLES

1. Control Sources Early.

A. Briefly identify all significant continuing sources of sediment contamination at the site. For each continuing source, briefly indicate source control actions being taken or to be taken, the expected time to complete these actions, who will undertake them, and how continuing sources are being monitored.

Source Control Strategy

DEQ and EPA are developing a Joint Source Control Strategy (SCS) for Portland Harbor. The objectives are to:

- Identify the universe of sources requiring control;
- Develop the necessary regulatory and technical framework;
- Facilitate the evaluation of sources of contamination to Portland Harbor;
- Define minimum data requirements for source control measures;
- Establish milestone and reporting requirements for source control activities.

The SCS has identified the following categories of contaminant sources to Portland Harbor - historical waste disposal activities, spills and leaks, point sources, harbor operations, and non-point sources. The purposed of the source control strategy is to identify and eliminate sources of contamination that pose a threat to human health and the environment. It will evaluate key

migration pathways, including run-off, groundwater migration, direct discharges and air transport.

Outfalls

There are 94 NPDES-permitted discharges to the ISA with most discharges occurring through the City's stormwater system. There are approximately 234 non-City outfalls in the ISA. There are 13 City stormwater outfalls and four combined sewer outfalls within the ISA. The contributions from these outfalls is unknown, but DEQ and the City are working on a pilot project for two basins, and the City recently collected sediment data adjacent to their outfalls. The results of the pilot projects will be use to develop an overall approach to evaluating the remaining stormwater outfalls.

Upland sources

DEQ has completed strategy recommendations, including recommended actions and priorities, for approximately 40 upland sites in the Portland Harbor area. They are currently overseeing about 50 active investigations of potential upland sources of contamination through individual agreements with facility owner/operators. These ongoing investigations will be providing information on ongoing sources of sediment contamination. The following sites are classified by DEQ as Tier 1 Sites (existing sediment data and site history indicates it is a localized source area)

- ACF Industries/Georgia Pacific - PAHs
- Port of Portland T4 slip 3 - PAHs and metals
- ARCO - PAHs,
- Mar Com Marine - metals from sandblast grit
- US Moorings - PAHs and metals
- Crawford Street - PAHs and metals (sandblast grit)
- GASCO - PAHs, metals
- Wacker - PAHs
- ATOFINA -DDT,DDE, DDD
- Riedel (Triangle Park Property) - metals, TBT
- Portland Shipyard - PCBs, SVOCs, metals, TBT

Source control actions have been selected, are underway, or completed for a number of facilities, including the following interim actions:

- ATOFINA - removal of portions of DDT source material
- Willbridge Bulk Fuel Terminals - installed cutoff wall for LNAPL
- Mobil Oil Terminal - installed slurry wall to contain TPH, diesel leaks
- Crawford Street Corp(steel fabrication) - removed 380 tons of contaminated sandblasting grit from the site and stabilized the bank area
- Port of Portland T4 - removal action for pencil pitch from Slip 3
- Gunderson - soil vapor extraction and groundwater pump and treat
- McCormick and Baxter NPL Site - upland soil removal, subsurface barrier wall installed

Sediment contamination associated with upland sources

Available historical sediment chemical data shows a variety of contaminants associated with upland sites.

Metals - Elevated metals, including arsenic, cadmium, copper, lead, mercury, zinc and tributyltin

have generally been detected in slips, adjacent to historic and current ship maintenance operations (Portland Shipyard, Mar Com Marine, and Willamette Cove) and in near-shore sediment adjacent to other specific industrial operations (Oregon Steel Mills, US Moorings, McCormick and Baxter).

PAHs - PAHs occur in sediments throughout the ISA, with the highest concentrations near GASCO and McCormick and Baxter at RM 7.5. Other areas with elevated PAHs are adjacent to bulk fuel facilities on the west bank between RM 4 and 8.

Chlorinated Pesticides and herbicides - DDT, DDE and DDD have been detected throughout the ISA, with the highest concentrations downstream of ATOFINA a former pesticide manufacturer and Rhone-Poulenc (now Aventis), a former pesticide/herbicide manufacturer. 2,4-D and 2,4 DB have been detected downstream of the Rhone-Poulenc site.

Dioxins and Furans - data is limited with the samples collected from sediment near the Rhone-Poulenc and McCormick and Baxter sites.

Phthalates - have been detected throughout the ISA; there is some evidence that they may be associated with City outfalls.

B. Where there is uncertainty about the timing or effectiveness of source control actions, briefly indicate (1) how the potential for recontamination has been considered in the selection or development of the proposed sediment remedy, and (2) whether the proposed sediment remedy is expected to be beneficial if source control is not effective or not complete by the time the proposed sediment remedy is planned to be implemented.

The potential for recontamination will be evaluated as part of the RI/FS and through the Joint Source Control Strategy.

2. Involve the Community Early and Often.

A. Briefly describe the role of the community in the RI/FS or EE/CA and the mechanisms that were used to solicit effective involvement of a variety of community members in sediment-related issues.

Historical community involvement and interest in Portland Harbor have occurred due to both cleanup activities at individual sites and through the highly-publicized listing process. Before site listing, DEQ hosted several public meetings and solicited feedback on their proposed sediment management plan as part of their request for deferral of the site.

EPA and DEQ released a Community Involvement Plan in February 2002, which included suggestions made by local residents during community interviews. Several public meetings have been held to ensure that the EPA is aware of the issues concerning the community.

EPA assisted the community with formation of a Community Advisory Groups (CAG) in Spring of 2002. The CAG meets monthly and has provided comments to the EPA and the LWG on technical documents, including the Round 1 Sampling Plan and the revised RI/FS Work Plan. EPA and DEQ regularly attend and participate in the CAG monthly meetings.

A local group called the Willamette Riverkeeper is the TAG grantee for the site. They have retained a technical consultant and provide input to the CAG and directly to EPA on various

technical issues and documents.

EPA makes technical documents available directly to the CAG and TAG and posts documents on the EPA Region 10 Website for the general public.

B. Briefly describe how local societal and cultural practices were considered in (1) the human health risk assessment (e.g., local recreational use of the water body, local fishing practices) and (2) the selection or development of the proposed remedy (e.g., current and future uses of the water body).

The human health risk assessment has not been conducted, but local societal and cultural practices are expected to have a significant impact on decision-making. Although much of this segment of the river is used for industrial and commercial purposes, it also supports recreational and subsistence fishing of both resident and anadromous species. EPA and the PRPs have not reached agreement on fish ingestion rates that will be evaluated in the human health risk assessment.

C. Briefly describe the major ways the proposed sediment remedy is expected to affect the local community during remedy implementation.

Sediment remedies have not been proposed for this Site.

Decision-making will likely affect the individual industrial and commercial facilities and local community. The Corps of Engineers has a need to dredge portions of the navigation channel to maintain the -40ft depth to allow continued use by container vessels, but is concerned about liability issues associated with the site. At this time, there are no in-water disposal options available to the Corps and their Dredged Material Management Plan is being revised and updated.

D. What is the expected level of community support for the proposed sediment remedy? Briefly identify any aspects that are expected to be of great concern and how the expected concerns have been addressed or considered.

Unknown. Sediment remedies have not been proposed.

3. Coordinate with States, Local Governments, Tribes, and Natural Resource Trustees.

A. Briefly describe the major sediment-related issues in which State and local governments have been involved at the site. Briefly identify any aspects that are expected to be of great concern and how the expected concern has been addressed or considered.

DEQ initiated several limited-scope sediment investigations at this Site in the 1990's, and requested assistance from EPA in 1996 to conduct a comprehensive assessment of the lower Willamette River. EPA and DEQ conducted a joint assessment in 1997 using EPA's contractor, Weston, to gather sediment chemistry in the area from Sauvie Island to Swan Island. The results led to EPA's decision to list the site and the state's decision to request deferral. The tribes and natural resource trustee agencies were very active during the deferral/listing process, and advised EPA of their concerns that tribal and trustee rights would not be protected if the site were deferred.

Following site listing, EPA negotiated and signed a Memorandum of Understanding (MOU) with DEQ, NOAA, Oregon Department of Fish and Wildlife, US Department of Interior, and six tribal governments (Yakama Nation, Grand Ronde, Siletz, Warm Springs, Nez Perce, Umatilla). Collectively, EPA, the state, the tribes, and trustees are considered part of the EPA project team. The MOU defines the roles of EPA and DEQ with regards to the upland versus in-water portions of the site. DEQ is the lead agency for the upland portion while EPA is the lead agency for the in-water portion of the site. The MOU also established the Technical Coordination Team (TCT), composed of representatives of the MOU signatories, to provide opportunities for input into EPA decision-making. The TCT meets twice per month, and has provided formal and informal comments to EPA on all aspects of work planning and sampling activities.

The City of Portland is a PRP and member of the LWG. The City also has a number of local initiatives related to the lower Willamette River, including their River Renaissance program.

B. For sites that include water bodies where Total Maximum Daily Loads (TMDLs) are being or have been developed, briefly describe the coordination efforts with the State and with EPA's water program. Identify any aspects of the TMDL that were considered in selection of the proposed remedy.

DEQ's 303(d) list of impaired waters in Oregon includes the main stem and tributaries of the Willamette River above Willamette Falls. Mercury, PCBs, aldrin, dieldrin, and DDT are listed for RMs 24.8 to 54.8. DEQ is currently developing TMDLs for the 12 Willamette sub-basins. Nine of these plans are due to be completed by 2003. A TMDL for 2,3,7,8-TCDD was developed in 1992, and a TMDL for mercury is being developed.

Fish tissue data, sediment data and surface water sampling data that is generated during the RI/FS will be evaluated by DEQ's water quality program to consider additions or modifications to the 303(d) list and evaluate whether development of additional TMDLs is appropriate.

In addition to the contaminants of interest for Portland Harbor, DEQ is also developing temperature and bacteria TMDLs.

C. If there are Tribal interests at the site, briefly identify any aspects of the proposed sediment remedy that are expected to be of great concern and how the expected concern has been addressed or considered.

Sediment remedies have not been proposed for this Site.

Six tribal governments have an interest in the Portland Harbor Site. Five of the six tribes share a common consultant and are active in EPA's Portland Harbor Technical Coordination Team. Through the listing and various work plan reviews, the tribes have identified a number of major issues, including protection of species and habitat for usual and accustomed fishing areas, protection of specific treaty rights and cultural resources.

The Willamette River is considered a usual and accustomed fishing area for the tribes. Four of the tribes have treaty rights to take fish from the Willamette and have harvested salmon, steelhead and lamprey at Willamette Falls, upstream of the ISA. These species migrate through Portland Harbor, and the tribes are concerned about contamination of their treaty-protected resources. Lamprey are harvested at Willamette Falls each in late Spring and distributed to tribal members for consumption and ceremonial purposes.

The RI/FS Work Plan is proposing to evaluate cultural resources and cultural uses using a typical

approach provided under Section 106 of the National Historic Preservation Act. The evaluation will be coordinated with EPA and the tribes.

D. If there are Natural Resource Trustee interests at the site, briefly identify the major areas of coordination related to the sediment response action. Are Trustee restoration activities expected concurrent with or following the Superfund action?

Natural resource trustees actively participating in the Technical Coordination Team include U.S. Fish and Wildlife (USFW) and the National Oceanic and Atmospheric Agency (NOAA). The State of Oregon trustees include Oregon Department of Fish and Wildlife and DEQ.

EPA coordination with the trustees occurs primarily through trustee participation in the Technical Coordination Committee. The trustee also provide comments to EPA on PRP submittals, including the RI/FS work plans and sampling plans.

The natural resource trustees are currently negotiating an agreement with the Lower Willamette Group to evaluate potential resource damages and restoration options. The intent is that restoration activities be conducted concurrent with CERCLA action.

4. Develop and Refine a Conceptual Site Model that Considers Sediment Stability.

A. Attach a copy of the conceptual site model (e.g, one or more diagrams or charts, not numerical models) for sediment which identifies contaminant sources, contaminants of concern, affected media, existing and potential exposure pathways, and human and ecological receptors that may be threatened.

See attached figures from the draft RI/FS Work Plan.

B. Identify the natural and man-made disruptive forces that were considered and how they were considered when evaluating sediment alternatives. Where appropriate, identify the intensities or recurrence intervals of the forces, e.g. hurricane rating, flood recurrence interval and briefly explain why these intensities or recurrence intervals were chosen.

The LWG conducted a historical analysis of navigation channel bathymetry from RM 0 to RM 11.7 to begin to understand sedimentation and erosion patterns in the lower Willamette River. The analysis used Corps of Engineers survey data from 1983-2001 and hydrology data from USGS. This data was integrated with a sediment trends analysis that was prepared by GeoSea Consulting. Detailed bathymetric surveys were conducted in December 2001, and again in July and September 2002. Another survey is planned for early 2003 to try to capture high flow conditions.

The PRPs have proposed using the a hydrodynamic and sediment transport model, the EFDC model. The modeling proposal, submitted by West Consultants, is currently under review. The model is intended to evaluate spatial and temporal sediment transport patterns, determine whether physical processes (including major flood events) expose previously buried contaminated sediment or result in burial of contaminated sediment, and quantify rates and locations of sediment accretion and erosion. Flood occurrence intervals and intensities have not been selected, however, and most of the detailed bathymetry is based on fairly low-flow conditions. The lower Willamette River floods in 1996 and 1997 exceeded the predicted 100-year flood events.

5. Use an Iterative Approach in a Risk-Based Framework.

A. Briefly describe the major ways in which an iterative approach was used at the site. (We define “iterative approach” broadly to include approaches that incorporate testing of hypotheses and conclusions and foster re-evaluation as new information is gathered.)

Iterative approaches will be considered in the field sampling plans that are being developed as part of the RI/FS Work Plan.

B. Briefly describe any early or interim actions planned or implemented at the site that address threats from contaminated sediment.

The Port of Portland and EPA have begun negotiations for an EE/CA and removal AOC to address sediment contamination at their Terminal 4, Slip 1 and 3 sites. Sediment in these slips are contaminated with PAHs, zinc and lead. A number of bioassays from Slip 3 failed for toxicity. DEQ also recently issued a decision memorandum requiring cleanup of upland property, including groundwater extraction and containment and removal of contaminated bank material.

C. If the proposed sediment remedy will be implemented in phases or is part of a larger phased approach to the site as a whole, briefly describe the phases.

Proposed sediment remedies have not been identified. In addition to potential early actions, like the Port's T4 project, phasing options will be evaluated as part of the FS.

6. Carefully Evaluate the Assumptions and Uncertainties Associated with Site Characterization Data and Site Models.

A. Briefly identify the most important continuing uncertainties associated with site characterization data and, where applicable, with qualitative or quantitative models, including input parameters, which were important (1) to the human health and ecological risk assessments and (2) to the evaluation of potential sediment remedies. Briefly explain how those uncertainties were accounted for (e.g., use of sensitivity analyses or reasonable conservative assumptions.)

Site characterization and input into models have not been completed. EPA is currently evaluating limitations on the use of historical data because of concerns about data quality and representativeness.

B. Identify any computer models used in the assessment of the site or evaluation of sediment alternatives. For each model or model group, indicate whether the model or model application was peer-reviewed and if so, briefly indicate whether that review was internal or external to EPA.

The PRPs have proposed a hydrodynamic and sediment transport model, but EPA has not formally commented on it. Because the model was only recently proposed, it has not been peer-reviewed either internally or externally, but EPA does expect to solicit comments from the Corps on this model.

7. Select Site-specific, Project-specific, and Sediment-specific Risk Management Approaches that will Achieve Risk-based Goals.

A. Briefly list all risk management approaches or alternatives that were evaluated for remediation of contaminated sediment at the site. Where this list does not include some form of each of the three major sediment cleanup methods (i.e., capping, monitored natural recovery, dredging, and/or combinations of these), briefly explain why the method was not appropriate for evaluation.

Since the RI/FS Work Plan is still being completed, risk management approaches or alternatives have not been fully developed. The Work Plan does describe an approach that would include an evaluation of each of the major sediment cleanup methods - capping, dredging, monitored natural recovery and various combinations.

B. Briefly outline the proposed sediment remedy for the site and how it relates to any other sediment operable units at the site.

Again, because the RI/FS is just getting underway, no sediment remedy has been recommended for the river. The selected remedy for the McCormick and Baxter Site, a separate NPL listed site located within the ISA, includes construction of a barrier wall (sheet piling with bentonite slurry) and sediment capping.

8. Ensure that Sediment Cleanup Levels are Clearly Tied to Risk Management Goals.

A. Briefly summarize the risks associated with contaminated sediment that were identified in the human health and ecological risk assessments.

The human health and ecological risk assessments have not been completed.

B. What remedial action objectives (RAOs) or removal objectives were developed to address these risks?

The RIFS has not been completed. The following preliminary RAOs were established in the AOC:

- Protection of survival, growth and reproduction of benthic invertebrates;
- Protection of survival, growth and reproduction of fish and shellfish;
- Protection of survival, growth and reproduction of birds and mammals;
- Protection of survival, growth and reproduction of species listed under the Endangered Species Act; and
- Protection of human health (cancer and non-cancer impacts) from ingestion of aquatic life and exposure to sediments and surface water and groundwater, as a result of dermal exposure and incidental ingestion, through expected beach use, in-water recreation, occupational activities and ceremonial and subsistence fishing.

C. Briefly describe the sediment cleanup and action levels, including how they were derived and how they relate to the RAOs or removal objectives.

Sediment cleanup and action levels have not been identified.

9. Maximize the Effectiveness of Institutional Controls and Recognize their Limitations.

A. Briefly list any institutional controls that are part of the proposed sediment remedy. Describe any plans to maximize their effectiveness (e.g., public education regarding fish consumption advisories).

Since the RIFS has not been finalized for the river no specific ICs have been proposed. There is a current fish advisory for the Willamette River for mercury and a narrative advisory for organic contamination.

B. Briefly describe any plans for on-going monitoring and gathering of information at the site which may indicate the effectiveness of institutional controls.

The fish tissue data that will be available in late August will provide the first comprehensive baseline of information for the lower Willamette River. The Oregon Health Department and ATSDR will be evaluating the fish tissue data to determine if changes to the existing fish advisories are required. The need for additional data will be evaluated as part of the RI/FS, but it is anticipated that additional sediment and fish tissue data will need to be collected during and after the remediation to evaluate the results of cleanup and the need for and effectiveness of fish advisories.

10. Design Remedies to Minimize Short-term Risks While Achieving Long-Term Protection.

Sediment remedies have not been identified. Short term risks and long-term protection will be evaluated as part of the FS.

A. Briefly list the cleanup methods or natural processes to be used to achieve long-term protection at the site, the length of time expected to achieve RAOs or removal objectives, and how short-term risks of implementing those methods are minimized. Remedy-specific examples are listed below:

For in-situ capping, list: 1) the physical, chemical, and biological processes that are most important to cap design to ensure long-term protection at this site, and 2) measures that will be required to minimize contaminant releases during cap placement, and 3) monitoring of the cap to ensure protectiveness.

For monitored natural recovery, list: 1) the major physical, chemical, and/or biological processes that will be relied upon to achieve and maintain long-term protection at the site, and 2) any measures that will be required to minimize risks during the recovery period.

For dredging, briefly describe the measures that will be required to minimize releases and short-term risks during dredging, treatment (if any), and transport. If on-site disposal is planned, briefly describe the disposal unit and monitoring that will be required to assess protectiveness.

B. Briefly list the major expected effects of the proposed remedy on societal and cultural practices and how this was considered in remedy selection.

11. Monitor During and After Sediment Remediation to Assess and Document Remedy Effectiveness.

Monitoring plans have not been developed.

A. Briefly describe the type of monitoring that will be required to assess contaminant releases during remedy implementation (i.e., during dredging, during cap placement, or during the recovery period in the case of monitored natural recovery.)

B. For each medium that has a cleanup level or remedial action objective listed in the answer to #8A above, briefly describe the type of monitoring (including physical, biological, and chemical monitoring) that will be required to determine whether the levels and objectives are met, and whether sufficient baseline data are available. Where they are not, briefly indicate plans for additional data collection prior to implementation of the remedy.

C. Briefly indicate other plans for long term monitoring (e.g., monitoring of long-term success of source control measures, effects of disruptive events, migration of buried contaminants, cap integrity)